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TECHNICAL MEMORANDUMS

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No. 260

AIR FLOW-EXPERIMENTS

By C. Wieselberger.

From Report II of the
Göttingen Aerodynamic Institute.

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May, 1951

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

TECHNICAL MEMORANDUM NO. 260.

AIR-FLOW EXPERIMENTS.*

By C. Wicselsberger.

With the apparatus previously described, we have made a large number of air-flow photographs, a few of which (Figs, 2-7) are given here. In taking such photographs, it is advisable to have a dark background, so as to bring out the white smoke by contrast. Since the exposures had to be very short, we employed flash-lights for illumination.

The flash-light powder was placed at one side of, or behind, the camera and ignited by electricity at the desired moment. In many cases it was also possible to place the source of light behind the object. Figs. 2-5 show the flow at the end of a wing for different angles of attack. The smoke was introduced through a pipe into the inside of the wing and escaped through three nozzles (1, 2, 3) as shown in Fig. 1. Nozzle No. 1 was

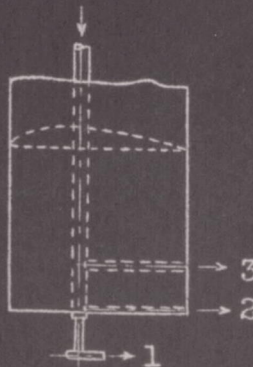


Fig.1.

located somewhat beyond the end of the wing. It could be turned and adjusted to the direction of flow, which varied greatly at this point. The photographs show chiefly the spiral course of the lines of flow near the tip of the wing. They constitute therefore a visual presentation of the phenomena covered by the airfoil theory. At the angle of attack of -5° (Fig. 2) the lift was zero. Here there was a smooth rectilinear flow of the emerging smoke. The other pictures plainly show a vortical entwining of the two outer threads of smoke, which, as a result of the marginal vortex, increased with the angle of attack.

Figs. 6 and 7 show the flow about two geometrically simple bodies, a parallelepiped and a sphere. The Reynolds number in the latter experiment was about 50,000, so that the flow was below the "critical."

Translated by Dwight M. Miner,
National Advisory Committee
for Aeronautics.

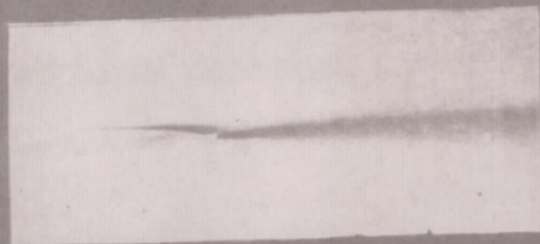


Fig. 2.

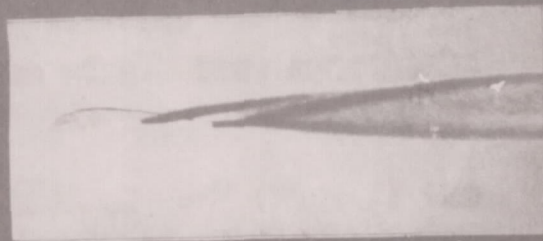


Fig. 3.



Fig. 4.

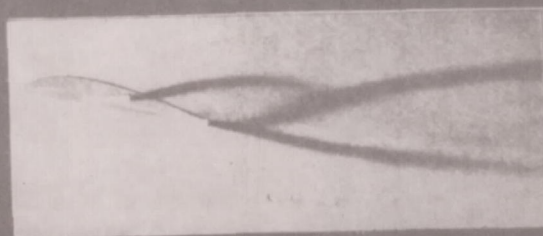


Fig. 5.

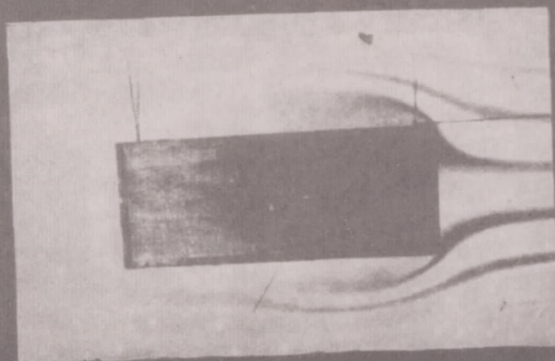


Fig. 6.

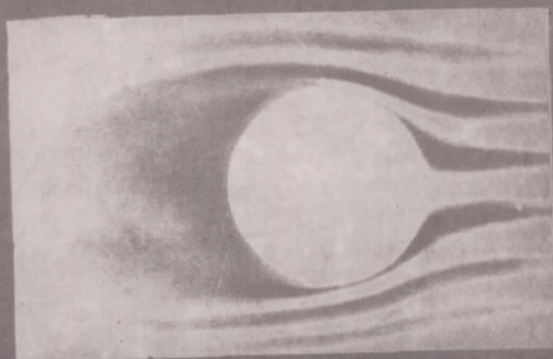


Fig. 7.